

That which is claimed is:

1. A focused particle beam metrology device comprising:
 - a focused particle beam source which produces low intensity focused particle beam directed to a semiconductor device having features thereon;
 - 5 a detector which detects electrons or ions emitted from said semiconductor device;
 - a processor which receives data from said detector and measures dimensions of said features from said data;
 - a discharge device which introduces an organic chloride toward said
 - 10 semiconductor device; and
 - a control device connected to said particle beam device to vary intensity of said focused particle beams for generating a high intensity focused particle beam to etch said semiconductor device.
- 15 2. The metrology device of claim 1, wherein said detector is located substantially above said semiconductor device for top-down linewidth measurements.
3. The metrology device of claim 1, further comprising a display device connected to said processor, wherein said display device displays an image of said
- 20 semiconductor device.
4. The metrology device of claim 1, wherein high intensity focused particle beam completely etches through said semiconductor device.
- 25 5. The metrology device of claim 1, wherein the semiconductor device includes a copper layer.
6. The metrology device of claim 1, wherein said high intensity particle beams etch a crater in said semiconductor device exposing a cross-section of said
- 30 semiconductor device, and said low intensity particle beams scan said cross-section at a predetermined angle to form an image of said cross-section.

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7. The metrology device of claim 1, further comprising a movable platform for holding said semiconductor device, wherein said movable platform is tilted at said predetermined angle during said low intensity particle beam scanning of said cross-section.

8. A microelectronic device comprising a copper layer on a substrate, said copper layer having an opening formed therein, said opening having a side wall and said opening exposing a surface portion of said substrate, said surface portion having surface topography less than 30% relative to the thickness of the copper material removed, and said side wall having a slope not greater than 10 degrees from vertical.

9. A microelectronic device according to claim 8, said surface portion having surface topography less than 20% relative to the thickness of the copper material removed, and said side wall having a slope not greater than 5 degrees from vertical.

10. The device of claim 8, wherein said opening is a well.

11. The device of claim 8, wherein said substrate comprises a dielectric.

12. The device of claim 8, wherein said substrate comprises a semiconductor.